

REMARKS

Claims 1 and 3-7 are pending in this application and stand rejected. Applicants seek to amend claim 1. Claim 1 remains independent.

Support for the revision to claim 1 can be found throughout the disclosure. By way of non-limiting example, it will be appreciated that the specification teaches at page 15, lines 3-13, that the driving device may be a servo controlled motor, such as an AC servo-motor, which can be controlled with high resolution (e.g. 0.1 mm).

The Rejections Under 35 U.S.C. § 103

Claims 1, 3 and 5-7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over what the Office Action referred to as Applicant's admitted prior art ("AAPA") in view of U.S. Patent No. 4,506,577 to Shinomiya. Applicant respectfully traverses this rejection, and submits that one skilled in the art would not be led to the claimed invention for at least the following reasons.

As will be explained in detail below, the claimed invention patentably distinguishes over the combination of cited references because Shinomiya does not teach motion of the slit/scorer in the manner claimed. The AAPA, the Office Action admits, fails to suggest diagonal motion of a slit/scorer following vertical motion of the slit/scorer (Office Action, p. 3, first paragraph), and so the Office Action looks to Shinomiya to remedy this deficiency.

It must be kept in mind that Shinomiya provides two different mechanisms for horizontal movement of rotary cutters 3 and 4. More specifically, as shown in Fig. 2 and described at col. 3, line 33, through col. 4, line 6, Shinomiya uses a screw rod 16 and coupled supporting arm 13 to separate the upper rotary cutter 3 from the lower rotary cutter 4. This

movement occurs while the upper rotary cutter 3, held by the supporting arm 13, is swung upward. Only after this are the shifters 5, 6 moved horizontally by feeding screws 9 and 10. Then, after this, the upper rotary cutter 3 is moved back toward the lower rotary cutter 4 by reverse operation of the screw rod and supporting arm (this is backward motion). The relevant portions of Shinomiya read as follows:

The operation of the foregoing example of the present invention will be explained as follows. In order to provide a space distance between the upper and lower rotary cutters 3, 4 for any desired one of the left side assemblies 11, 11, 11 and for adjusting the width of the upper and lower rotary cutters 3, 4 of the corresponding opposite one of the right side assemblies 11, 11, 11, the rotary cutters 3, 4 of the left side assembly 11, for instance, are shifted through the corresponding shifters 5, 6. **Prior to this shift movement, out of the two rotary cutters 3, 4 which are mutually laterally in overlapped relationship, as shown in FIG. 2 and FIG. 3, the upper rotary cutter 3 is separated upwards from the lower rotary cutter 4 by swinging the supporting arm 13 upwards by the operation of the first driving means 17. During this operation, the supporting arm 13 which is being swung upwards is, at the same time, guided by the threads of the screw rod 16 to be moved laterally along the axial direction of the screw rod 16.** During this movement, it is preferable that the lateral moving direction thereof is such that the upwardly swinging upper rotary cutter 3 moves away from the lower rotary cutter 4. In this manner, the opportunity of the two rotary cutters 3, 4 being brought into abutment one with another and being damaged during the time when the upper rotary cutter 3 is being swung upwards from the lower rotary cutter 4 by the swing movement of the supporting arm 13 is surely avoided.

Thereafter, the upper and lower shifters 5, 6 are moved to predetermined positions by means of the respective feeding screws 9, 10. Finally, the supporting arm 13 is swung downwardly by the driving means 17 and in conjunction therewith the upper rotary cutter 3 is moved downwardly to a position at which the same is slightly laterally overlapped with the lower rotary cutter 4. During this operation, the supporting arm 13, which is being swung downwardly, is moved laterally along the thread of the screw rod 16 by the guidance of the same. During this movement, it is preferable that the lateral moving direction thereof is such that the downwardly swinging upper rotary cutter 3 comes nearer to the lower rotary cutter 4.

(emphasis added).

This path, it will be appreciated, is shown as Path I on the sketch at page 6 of Applicant's previous Amendment, filed June 9, 2006, to which sketch the Examiner is again respectfully referred.

The claimed invention is not suggested by the combination of the AAPA and Shinomiya. This invention, according to claim 1, involves a method for controlling a slitter-scoring apparatus by supplying a paperboard sheet along a feed line and moving a slitter/scorer including at least one of a slitter and a scorer in at least one of a vertical direction by a mechanism for vertically moving said slitter/scorer and a widthwise direction by a mechanism for horizontally moving said slitter/scorer to an operative level where a surface of the paperboard sheet is processed thereby. Each mechanism for vertically and horizontally moving the slitter/scorer includes a servo motor. When the slitter/scorer moves from a first widthwise position of a first operative position to a second widthwise position of a second operative position, the slitter/scorer is caused to start moving only in the vertical direction while a level of the slitter/scorer is between a bottom surface of the paperboard sheet and a top surface of the paperboard sheet, and the slitter/scorer is moved simultaneously in the vertical direction and in a cross machine direction which cross machine direction is oriented from the first widthwise position to the second widthwise position so that the slitter/scorer moves diagonally toward the second cross machine position before the slitter/scorer moves only in the vertical direction and after the slitter/scorer moves only in the vertical direction.

Applicant has discovered that the feed line for paperboard need not to be stopped when an order for cutting or scoring has been changed, meaning the slitter/scorer has to be moved in a widthwise direction, provided the slitter/scorer can be moved quickly. Such fast motion is achieved using a servo motor, which can control the vertical position of the slitter/

scorer with high precision (e.g. 0.1 mm), and also by minimizing the vertical distance between the surface of the paperboard and the slitter / scorer during horizontal transfer thereof from the last operating position to the new operating position in a widthwise direction of the paperboard.

By virtue of this invention, the feed line is not stopped, meaning there is not extensive waste of the paperboard during transfer of the slitter/scorer to its new position. Accordingly, the method of claim 1 reduces setup time for production and thereby improves the effectiveness of the production line.

Applicants will now show various aspects of this invention that are not suggested by the cited art.

The claimed invention provides for the use of servo motors in the mechanisms that move the slitter/scorer vertically and horizontally.

In contrast, since the prior art uses air piston devices in order to move the slitter/scorer vertically from an operation position to a non-operating position, the vertical position of the slitter/scorer cannot be controlled with such a high precision as in the method according to claim 1, so that the slitter/scorer needs to be caused to descend to the new operating position. Thus the transfer of the slitter/scorer requires more time, so that a feed line of a paperboard needs to be stopped in order to avoid extensive waste paperboard.

Shinomiya also teaches away from at least the following aspects of this invention as claimed (these differences are easily understood in view of the following table):

Claim 1	U.S. Patent No. 4,506,577 (Shinomiya et al.)	Comment
wherein each of said mechanism for vertically moving said slitter/scorer and said mechanism for horizontally moving said slitter	first driving means 17 and second driving second driving means 18 are air cylinders with piston rods (col. 3, lines	Servo motors are not suggested by <u>Shinomiya's</u> air cylinders

scorer includes a servo motor,	14-22; Fig. 2))	
said slitter/scorer is moved simultaneously in the vertical direction and in a cross machine direction which said cross machine direction is oriented from said first widthwise position to said second widthwise position	as supporting arm 13 is swung downward by driving means 17, supporting arm 13 is moved laterally by screw rod 16 so that upper rotary cutter 3 approaches lower rotary cutter 4 (col. 3, line 63, through col. 4, line 6)	The horizontal component of the slitter/scorer is in the direction from the position where the slitter/scorer starts movement toward the position where the slitter/scorer will end movement; <u>Shinomiya</u> moves the upper rotary cutter backward toward the first position when it brings the upper rotary cutter 3 toward the lower rotary cutter 4, so the horizontal component of motion when <u>Shinomiya's</u> cutters reach their final position is the opposite of what is claimed.

The combination of the AAPA and Shinomiya fails to suggest at least the aspects of the claimed invention involving the use of servo motors for the mechanisms that shift the slitter/scorer horizontally and vertically. As explained at page 15, lines 3-13 of the specification, such a servo controlled motor can be controlled with high resolution. Such accuracy is not possible when using a conventional air piston device, as taught in Shinomiya, because such a device can only be controlled to shift point-to-point. That is, the structure being moved only can be accurately located at the beginning and ending positions of travel (separated by the piston's stroke).

The combination of the AAPA and Shinomiya also fails to suggest at least the aspects of the claimed invention involving the motion of the slitter/scorer in the cross machine direction, which is the direction from the initial slitter/scorer position to the final slitter/scorer position. The combination of those references at best would still move the slitter/scorer in the manner taught by Shinomiya, which, when the slitter/scorer is lowered back toward the workpiece, horizontally shifts the slitter/scorer backward toward the starting point of the slitter/scorer. That is, when Shinomiya's cutter moves diagonally and in part downward, the

horizontal component of the diagonal movement is oriented from the second widthwise direction to the first one, whereas in the claimed invention, the component of the diagonal movement is oriented from the first widthwise direction to the second one.

There is a further reason why the claimed invention is not suggested by Shinomiya's parallelogram-shaped cutter travel path (this path is shown in the sketch referred to above). Although the Office Action contends Shinomiya suggests the trapezoidal travel path of the slitter/scorer, that is not correct. Shinomiya's cutters only can describe a parallelogram-shaped travel path. Only the parallelogram-shaped cutter travel path is possible in Shinomiya because the upper end of Shinomiya's cutter is connected to the screw rod. In other words, when that cutter is caused to move up or down, the combination of vertical movement and the diagonal movement of the cutter cannot be realized, whereas in the present invention, such combined movement is possible due to use of the servo motors.

So Shinomiya does not suggest the slitter/scorer is moved simultaneously in the vertical direction and in a cross machine direction which cross machine direction is oriented from the first widthwise position to the second widthwise position. as claimed.

In this regard, it also will be appreciated that, as shown in the sketch of the previous Amendment referenced above, the total length of Shinomiya's travel path is **longer** than the travel path of the claimed invention, and so Shinomiya does not shorten the time to set up a slitter.

Applicants further submit that the traveling path at page 5 of the Office Action said to be taught by the combination of the AAPA, Shinomiya, and JP8-11245 is not possible, since that path must include a portion of the trapezoid path.

In other words, even if the AAPA, Shinomiya and JP8-11245 are combined, the travel path of the slitter/scorer having diagonal movement of the slitter/scorer after vertical movement and also diagonal movement before the vertical movement recited in claim 1 is not suggested.

Consequently, claim 1, as well as claims 3 and 5-7, which depend therefrom, avoids the cited art. Favorable reconsideration and withdrawal of this rejection are respectfully requested.

Claim 4 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the AAPA in view of Shinomiya, as applied to claims 1, 3 and 5-7, and further in view of Japanese Laid-Open Patent Appln. No. 8-11245. Applicant respectfully traverses this rejection, and submits the following arguments in support thereof.

Claim 4 depends from, and so incorporates by reference all the features of claim 1, including those features just shown to avoid the AAPA and Shinomiya. Claim 4 therefore patentably distinguishes over those references at least for same reasons as claim 1, which reasons are incorporated by reference herein.

As for JP 8-11245, the Office Action cites that reference as teaching the slitter is moved laterally while it is in paperboard. JP 8-11245 fails, however, to remedy the above-noted deficiencies of the AAPA and Shinomiya at least with regard to (1) the use of servo motors, and (2) the movement of the slitter/scorer in the cross-machine direction. Accordingly, the claimed invention avoids the combination of the AAPA, Shinomiya and JP 8-11245 for the same reasons it avoids the AAPA and Shinomiya.

Again, favorable reconsideration and withdrawal of this rejection are respectfully requested.

CONCLUSION

Applicants respectfully submit that all outstanding rejections have been addressed and are now either overcome or moot. Applicants further submit that all claims pending in this application are patentable over the prior art. Accordingly, favorable consideration and prompt allowance of this application are respectfully requested.

In view of the foregoing revisions and remarks, Applicants respectfully request entry of this Amendment After Final Rejection and submit that entry of this Amendment will place the present application in condition for allowance. It is further submitted that entry of this Amendment can be approved by the Examiner consistent with Patent and Trademark Office practice, since the changes it makes should not require a substantial amount of additional work by the Examiner. It is believed that the changes presented in this Amendment address matters that the Examiner has previously considered.

No fees are believed to be due in connection with the filing of this paper. Nevertheless, should the Commissioner deem any fee(s) to be now or hereafter due in connection with this application, authority is given to charge all such fees to Deposit Account No. 19-4709.

In the event that there are any questions, or should additional information be required, please contact Applicants' attorney at the number listed below.

Respectfully submitted,

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